# Erratum: Proton hole states in neutron rich nuclei near $A = 100$ [Phys. Rev. C 24, 902 (1981)]

E. R. Flynn, F. Ajzenberg-Selove, Ronald E. Brown, J. A. Cizewski, and J. W. Sunier

The purpose of this Erratum is to correct results we presented recently in this journal. In the portion of this work in which we studied the $^{110}Pd(\vec{t},\alpha)^{109}Rh$ reaction, we did not identify correctly the $\alpha$-particle group leading to the $^{109}Rh$ ground state. This error resulted in our listing incorrect excitation energies for states in $^{109}Rh$. The reanalysis of the data was triggered by work in progress[1] on the $^{106,108}Pd(\vec{t},\alpha)^{105,107}Rh$ reactions, which showed that the $J^\pi$ of the ground states of $^{105,107}Rh$ are $\frac{7}{2}^+$. In the work we are correcting, we assumed that the ground state of $^{109}Rh$ was a very strongly populated $J^\pi=\frac{9}{2}^+$ state (see Figs. 1 and 3, and Table II), and in fact it appeared that all of the states of $^{109}Rh$ with $E_x \leq 1$ MeV were strongly populated.

Our reanalysis shows two additional groups of $\alpha$ particles at $E_\alpha$ higher than that of the group associated with the state previously labeled as the ground state (group 0 in Fig. 1 and Table II): These additional groups are very weak, with intensities typically 1 percent of the intensity of the previous group 0, but ranging from 0.1 to 10 percent depending on the angle of observation and on the polarization direction of the incident tritons. One of these two groups is due to the state[1] at $E_x = 754$ keV ($J^\pi=\frac{3}{2}^-$) in $^{107}Rh$ which is strongly populated in the $^{108}Pd(\vec{t},\alpha)$ reaction, and which is seen here because $^{108}Pd$ was present in the target as a 1.3 percent contaminant.

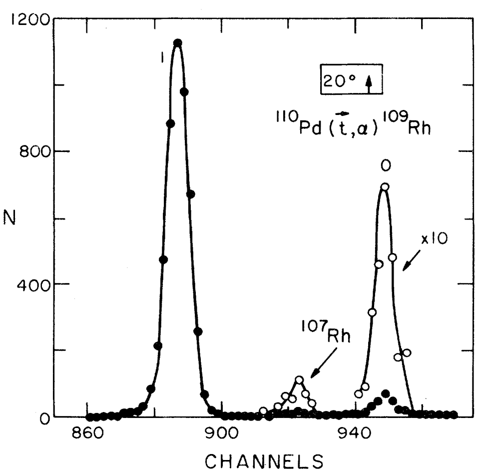


FIG. 1. Portion of the spectrum of $\alpha$ particles from $^{110}Pd+\vec{t}$, at $\theta=20°$, spin up. The ordinate shows $N$, the total number of counts in a two-channel bin. The open circles have been replotted to show ten times the actual number of counts in groups 0 and $^{107}Rh$. For the parameters of groups 0 and 1, please see Table I and the text. The group labeled $^{107}Rh$ is due to the 754 keV state in that nucleus.

Figure 1 of this Erratum shows the previous group 0 (now relabeled 1) and the new group 0 plotted at the condition of maximum intensity of that group ($\theta=20°$, spin up). We find that $Q_0$ for the $^{110}Pd(\vec{t},\alpha)^{109}Rh$ reaction is $9206\pm25$ keV, giving a measured mass excess of $^{109}Rh$ of $\Delta\mu = -85\,016\pm40$ keV, with 20 keV of this error arising from the mass uncertainty of the target $^{110}Pd$. The value quoted by Wapstra and Bos,[2] from systematics, is $-85\,110\pm100$ keV. The $J^\pi$ assignment of this state is consistent with $J^\pi=\frac{7}{2}^+$ based on $A_y$ (see Fig. 2 here), although the angular distribution is not well matched by the distorted wave calculations.

As a result of this reanalysis a number of changes need to be made in the work being corrected. Table I here should replace the earlier Table II. The numbers which label the peaks in the earlier Fig. 1 should be larger by one (i.e., the previous group 0 is now group 1). Figure 1, here, supplements the earlier Fig. 1. The energies labeling the cross section and $A_y$ measurements in Fig. 3 should be increased by 206 keV (i.e., instead of 168 keV, read 374 keV).

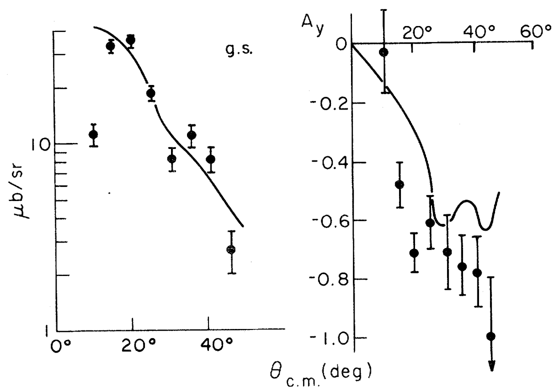


FIG. 2. Cross section and $A_y$ measurements for group 0. The lines represent distorted wave calculations described in the original paper.

TABLE I. Spectroscopic information from the $^{110}$Pd($\vec{t}$,$\alpha$)$^{109}$Rh reaction measurements.

| Level | $E_x$ (keV) | $L$ | $J^\pi$ | $C^2S$[b] |
|---|---|---|---|---|
| 0 | 0[a] | 4 | $\frac{7}{2}^+$ | 0.05 |
| 1 | 206±3 | 4 | $\frac{9}{2}^+$ | 3.7 |
| 2 | 374±3 | 1 | $\frac{1}{2}^-$ | 1.4 |
| 3 | 424±3 | (2) | $(\frac{5}{2}^+)$ | (0.21) |
| 4 | 566±3 | (1) | $(\frac{3}{2}^-)$ | (0.85) |
| 5 | 737±5 | 1 | $\frac{3}{2}^-$ | 1.7 |
| 6 | 852±5 | 3 | $\frac{5}{2}^-$ | 2.3 |
| 7 | 923±5 | (3) | $(\frac{5}{2}^-)$ | (0.72) |
| 8 | 1006±5[c] | | | |
| 9 | 1091±5 | 4 | $\frac{9}{2}^+$ | 1.90 |
| 10 | 1155±5 | (1) | $(\frac{3}{2}^-)$ | (0.19) |
| 11 | 1207±7 | (1) | $(\frac{3}{2}^-)$ | (0.10) |
| 12 | 1272±10[c] | (3) | $(\frac{5}{2}^-)$ | (0.33) |
| 13 | 1331±10[c] | (2) | $(\frac{5}{2}^+)$ | (0.11) |
| 14 | 1430±10 | | | |
| 15 | 1459±10 | (4) | $(\frac{9}{2}^+)$ | (0.40) |
| 16 | 1513±10 | (1) | $(\frac{1}{2}^-)$ | (0.18) |
| 17 | 1627±10 | (2,1) | $(\frac{5}{2}^+,\frac{3}{2}^-)$ | (0.44, 0.83) |
| 18 | 1746±10 | | | |
| 19 | 1914±10[c] | | | |
| 20 | 2019±10[c] | (1) | $(\frac{1}{2}^-)$ | (0.58) |
| 21 | 2261±10 | | | |

[a]See text for discussion.
[b]From $d\sigma/d\Omega = 11.6(2J+1)^{-1}(C^2S)\sigma_{DW}$.
[c]Group is broad and probably contains unresolved states.

The systematics, and the conclusions, will be discussed in a forthcoming paper.[1] Finally, the work on the $^{104}$Ru($\vec{t}$,$\alpha$)$^{103}$Tc reaction is correct.

We prepared this Erratum and these corrections in advance of the more general paper[1] because of the interest expressed by Dr. A. H. Wapstra and a number of our other colleagues, and because of our reluctance to have incorrect results (which we very much regret) remain in the scientific literature.

This work was supported by the U. S. Department of Energy.

[1]E. R. Flynn, F. Ajzenberg-Selove, R. E. Brown, J. A. Cizewski, and J. W. Sunier (unpublished).

[2]A. H. Wapstra and K. Bos, At. Data Nucl. Data Tables 19, 175 (1977).